

CASE REPORTS

Isolation of *Salmonella enterica* Serotype Newport from a Partly Ruptured Splenic Abscess in a Traveler Returning from Zanzibar[∇]

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***Salmonella enterica* subsp. *enterica* serotype Newport is a pathogen of growing importance because of its epidemic spread in dairy cattle and increasing rate of antimicrobial resistance. Human infections, however, are rare. We report a case of a splenic abscess in a young traveler returning from East Africa.**

CASE REPORT

In February 2007, a 20-year-old Caucasian male returning from a vacation in western Kenya, Zanzibar, and Tanzania was admitted to our hospital in Germany with anorexia and severe left upper abdominal pain. He had been well until the end of January, when he suddenly developed a high fever and malaise during a stay in Zanzibar. The patient was treated empirically for malaria at a local hospital with artesunate. He developed vomiting, diarrhea, and severe pain in the left upper abdomen. The patient was thereupon started on ciprofloxacin at 200 mg twice a day (b.i.d.) and transferred to Dar es Salaam. On examination, he had a temperature of 39.8°C, shallow breathing, tachycardia, and a very sensitive left upper abdomen. Abdominal ultrasound showed an enlarged spleen with a hypodense lesion, and a splenic abscess was suspected. Laboratory tests revealed a white blood cell count of 21,500/μl and a raised erythrocyte sedimentation rate of 85 mm/h. Liver function tests showed a mild elevation of γ-glutamyl transpeptidase activity. The patient was rehydrated, the ciprofloxacin dose was increased to 500 mg b.i.d., and diclofenac was administered. Upon stabilization, the patient was transferred to Germany.

At the time of hospitalization in Germany, the patient was afebrile. He had a white blood cell count of 8,300/μl, a C-reactive protein level of 21.99 mg/dl, and elevated liver enzyme levels (alanine aminotransferase, 136 U/liter; aspartate aminotransferase, 113 U/liter; γ-glutamyl transpeptidase, 421 U/liter). The international normalized ratio was 1.26. A computed tomography (CT) scan demonstrated a left-sided pleural effusion and a hypodense mass measuring 80 by 110 mm in the upper part of the spleen, which had ventromedially ruptured. The abscess was covered by the liver (Fig. 1). There were no lesions in the liver or any other abdominal organ. The abscess was drained transhepatically by the Seldinger technique under

CT guidance. A 450-ml volume of pus was aspirated, the abscess was flushed with Ringer solution, and a drainage tube was inserted. Metronidazole (400 mg b.i.d.) was added to the antibiotic regimen.

Microscopy of the aspirate showed many leukocytes, but no bacteria were seen. After 2 days of cultivation on solid medium at 37°C in an aerobic and 5% CO₂-enriched atmosphere, two mucoid nonhemolytic bacterial colonies grew on sheep blood agar. Gram staining demonstrated long, gram-negative rods. Oxidase testing was negative. After subcultivation for 24 h, the organism was growing lushly on blood agar and was lactose negative when cultured on MacConkey agar. The agglutination test for salmonella with polyvalent antisera was positive. The isolated organism exhibited the antigenic formula O:6, 8; H1:e; H2:1,2 and could thus be identified as *Salmonella enterica* serovar Newport, belonging to serogroup C. Biochemical identification was accomplished with the Vitek 2 system (*Salmonella* serogroup C, P 99.00). The eubacterial PCR of the aspirated fluid was also positive with primers directed against the conserved regions of the 16S rRNA gene. Sequence analysis of the amplicon revealed 100% identity with *S. enterica*. The isolate was susceptible to ampicillin, ampicillin-sulbactam, cefotaxime, the carbapenems, ciprofloxacin, and cotrimoxazole. Multiple aerobic and anaerobic blood cultures remained negative throughout the whole incubation period.

Following the intervention, the patient's condition markedly improved. Repeated CT scans initially showed slight bleeding into the former abscess, which completely resolved. After 5 days, the drainage tube could be removed. The patient was discharged 3 days later, and metronidazole was discontinued. At that time, the white blood cell count was 6,300/μl and the C-reactive protein level was 1.40 mg/dl. Ciprofloxacin was discontinued after 21 days of treatment. A follow-up period of 10 weeks was uneventful.

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S. enterica serotype Newport has been recognized as an emerging animal pathogen in recent years (22). In Africa, outbreaks of *S. enterica* serotype Newport-associated diarrhea

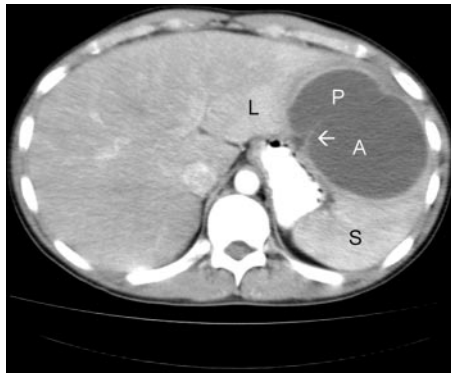


FIG. 1. CT of the upper abdomen after oral and intravenous application of contrast medium. The scan shows a hypodense splenic abscess (A) measuring 85 mm in diameter with a medial perforation (P) which is covered between the liver (L) and the spleen (S). The semilunar septum-like structure in the medial part of the lesion (arrow) corresponds to the surface of the spleen.

in humans have been linked to poultry and the consumption of undercooked eggs (1). In the United States, the pathogen has undergone a marked and rapid epidemic spread in dairy cattle (4). A particular multidrug-resistant (MDR) strain of this serotype that exhibits resistance to expanded-spectrum cephalosporins has been described (7, 17, 9), and a reservoir in dairy cattle has been established (22, 5). Cattle infected with MDR *S. enterica* serotype Newport shed the bacteria in manure for weeks or months (22), and manure applied to agricultural fields could be a source for human infections. *S. enterica* serotype Newport has been detected in raw milk (10), and an association of *S. enterica* serotype Newport infection and the consumption of raw ground beef exists (21). A concurrent increase in MDR *S. enterica* serotype Newport isolations from both animal and human populations has already been reported in the United States (14). In Tanzania, the prevalence of resistance to expanded-spectrum cephalosporins in *S. enterica* serotype Newport is low (2). The source of infection in the case of the young traveler described here remains uncertain. However, the patient remembered that he had eaten undercooked eggs for breakfast five times during his stay in Zanzibar. Thus, a source in poultry can be assumed, which is in concordance with a previous Ethiopian report (1). Antibiotic resistance of salmonellae in poultry is increasing in East Africa (16). However, the organism isolated was not of the MDR type.

S. enterica serotype Newport has caused a wide spectrum of clinical disease in humans, such as diarrhea (1), ileocecal lymphadenitis (15), chest wall abscess (20), pyosalpinx (18), spondylitis (6), osteomyelitis (19), endocarditis (13), meningitis (12), and septicemia (11). Most *Salmonella* infections result in mild-to-moderate, spontaneously resolving gastroenteritis (7). However, complications such as septicemia, meningitis, or abscess formation may occur. In splenic abscesses caused by salmonellae, *S. enterica* serotypes Typhi, Enteritidis, and Typhimurium are the most frequently isolated serotypes. Other serotypes are rarely found (8). In one case described in 1978, a splenic abscess due to *S. enterica* serotype Newport caused a subsequent empyema (3). Risk factors for splenic abscesses caused by salmonellae include immunosuppression, intravenous drug abuse, hemoglobinopathies, or previous trauma (8).

In the case described here, there were no clinical or laboratory findings indicative of a hemoglobinopathy or an underlying immunosuppression. A human immunodeficiency virus test was negative. Intravenous drug abuse was denied, and the patient could not remember any trauma.

Splenic abscesses are more prevalent in males and in younger age groups. Most abscesses are preceded by infections elsewhere in the body. Those sites serve as a focus for dissemination of microorganisms, unless the spleen is directly infected by a penetrating injury (8). Clinical symptoms often consist of fever and left upper quadrant tenderness. Laboratory tests show marked leukocytosis. The list of causative organisms is long, but in travelers returning from tropical areas, special attention should be paid to infections with salmonellae, *Entamoeba histolytica*, and *Burkholderia pseudomallei*, the causative agent of melioidosis. CT is the most sensitive tool for diagnosing a splenic abscess (8), but sonography is less costly and is readily available in many curative centers. Most authors recommend splenectomy as the treatment of choice. In selected cases and when the causative organism has been identified, drainage and antimicrobial chemotherapy can be considered as a therapeutic option (8), which proved successful in our patient.

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